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# ATARI ST

## Hacking The Atari ST

by Wynn Rostek

This month I would like to go over some extended bios calls, tell you a little about the extents used for executable files and start a small hardware project. I'll also tell you about the AUTO folder. Hang on to your hat, this is going to be a whirlwind.

Often I receive several letters on the same subject, so we address the request in the column. A prime example is the memory upgrade. We received letters from ST owners from Florida to Australia to Saudi Arabia. Since there was so much interest in the memory mod, we wrote an article on how to do it, complete with photographs and drawings.

If there are enough requests on any particular subject, I'll provide answers in this column. One item of interest to many of our readers seems to be how to contact the ST National Users Group. The ST National Users Group can be reached by writing to:

ST National Users Group  
3650 Sand CT.  
Mims, FL 32754

The ST National Users Group BBS can be reached by calling: (305) 383-1413.

The BBS is up 24 hours a day, 7 days a week, 365 days a year. Please use 8 bits no parity when calling. The BBS is 300/1200 baud and has a public section open to everyone, member and non-member

alike. Non-members may download files and read and leave messages. This BBS is ST only, and its main goal is technical support of the ST and supplying public domain utility programs for the ST.

R.A. Rieck of Rochester Minnesota wants to know how to obtain the 13 pin connectors used by the monitors on the ST. So far we have not found a source for the connector in question, but several members of the Users Group are still looking for them. I'm sure news will be posted on the ST UG BBS as soon as a source is located. He would also like to know how to obtain a copy of CHAT, the telecommunications program my company markets. If your local dealer does not carry CHAT, you can write to:

SST Systems  
P.O. Box 2315  
Titusville, FL 32781  
(305) 269-0063

CHAT is \$19.95 plus \$2.50 postage and handling. If you need quick delivery, UPS Blue delivery is \$1 extra.

You may have noticed that there are three common extents for executable files on the ST. Most programs will have a name like SAMPLE.PRg. Some programs have names like SAMPLE.TOS or SAMPLE.TTP. The extents PRg, TTP and TOS tell the computer what kind of environment the program runs in.

A program with an extent

(last name) of PRg is a graphics program. When the computer loads the program, it will set up the screen for graphics display. On a color system, the screen will be cleared to a solid green, the monochrome systems clear to a grey. The system also has a white bar across the top where the menu bar is displayed. If the program does not display a menu bar, then the system will display the program name in the center of the white bar.

A program with a TOS extent is one that works in a text mode. For a TOS program, the computer will clear the screen to solid white. It also places a rectangular cursor on the screen. This preparation is useful for programs like text editors and terminal programs where the screen handles mainly (or only) text.

The TTP extent is very much like the TOS except that the user is presented with a parameter alert box. The parameter alert box appears on the screen before the program is run. You may type information on the line in the alert, and it has an OK and a CANCEL box you can click. The OK box has the same effect as the Return key. The CANCEL box can be used to return to the desk top if you change your mind about running the program.

The information typed on the line in the alert box is passed to the program when the program is loaded into the

machine. Many programs are more useful if they can use command line arguments. Command line arguments are strings of characters that appear after the program name in normal (Non graphics) systems. An example of a program where command line arguments are normally used is a filter program. A filter program passes the text from a file through itself, changing the text in some way, and leaves

the changed file on disk.

Filter programs and text editors often need the name of the file that they will be working on. On most systems, they take the file name as a command line argument. Mince is a text editor that runs on many different machines. I have been using Mince on my CP/M system for four or five years now. On the CP/M system,

continued on page 214

## Personal Financial Advisor Now Available For The Atari 520ST

Financial Cookbook, a software product that helps people make personal financial decisions, is now available for the Atari 520 ST personal computer.

Introduced in May 1984, the program is already available for the Apple II, Commodore 64, Atari 800, IBM PC, Macintosh and Amiga. It has already received the Silver Certification from the Software Publishers Association, signifying more than 50,000 units sold.

"Financial Cookbook" contains 32 recipes, or formulas, that produce answers about taxes, investments, savings, mortgages, and other personal financial questions," said Trip Hawkins, president of Electronic Arts. "The program replaces the traditional calculator and spreadsheet approach, and can serve as a financial advisor. Our customers have found that it often pays for itself the first time it is used."

One key to the program's value is the complete instruction provided. It contains a tutorial, recipe instructions, and a 100-item index that helps users get answers right away. The manual provides easy-to-understand, thorough explanations of financial and tax issues and a 160-item glossary of financial terms.

Financial Cookbook provides answers to hundreds of questions such as: "How much do I need to save monthly to send my child to college in 6 years?" "Is it better to lease or buy a car?" "How will I be affected if I refinance my home at a different interest rate?"

Using the various recipes, any user, regardless of financial sophistication, can quickly figure such things as returns on investments, effective tax rates and the impact of IRA's, the effects of inflation, mortgage calculations, and tax rates. Each recipe asks the user to enter the variables, such as interest on inflation rates, and makes the calculations based on the figures entered.

All the figuring is done without the need for the user to build a complicated financial model or to have any knowledge of the complicated formulas behind the calculations.

Tax savings are particularly well covered in the Financial Cookbook. Calculations for 11 basic tax shelters available to most consumers are in the program.

Like all Electronic Arts personal productivity software, Financial Cookbook uses simple methods of interacting with the computer and a minimum number of keystrokes and commands. Those actions most often require the least conscious effort, so users quickly become competent in using the program. The Atari ST version also takes advantage of the pull-down menus, mouse interface and multiple windowing possible with the computer.

The program was written by Stan Trost with members of Electronic Arts' software staff. The suggested retail price is \$49.95.

For more information contact Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404; (415) 571-7171.

Mention that you read about it in *Computer Shopper*. ●

## Synapse Releases First Product For The Atari 520ST

Synapse's first product for the Atari 520ST computer is being released according to Doug Carlston, president of Broderbund Software, Inc. Synapse is a wholly owned subsidiary of Broderbund.

**Mindwheel**, a science fiction text adventure game, now is available for the new Atari computer as well as for the IBM PC, Apple II, Macintosh, Commodore 64/128 and Atari 400/800/XE/XL computers.

The game is a time journey through the minds of four people—a peace activist rock star, a monstrous dictator, a

heroic poet and a gifted scientist. The player's goal is to retrieve the Wheel of Wisdom—the key to civilization's survival.

By featuring a vocabulary of 1,200 to 1,500 words for realistic dialogue with characters, **Mindwheel** lets players concentrate on strategy instead of spending time figuring out what words the game will understand. And it's played in real time so that while the player is deciding what to do next, the action continues.

"The game has been engineered specifically for the

Atari ST," said Richard Sanford, Broderbund product manager for **Mindwheel**. "It uses the ST's interface and features pull-down menus, mouse and keyboard interface and the ability to make up dialogue and save it for future use."

**Mindwheel** for the Atari 520ST requires 512K of memory and has a suggested retail price of \$44.95.

For more information contact Broderbund Software Inc., 17 Paul Drive, San Rafael, California 94903-2101, Telephone (415) 479-1170.

Mention that you read about it in *Computer Shopper*. ●

# Randy's Atari ST Column

by Randy Holcomb

This month we'll look at Personal Pascal from OSS, VIP Professional Lite from VIP Technologies, and a BBS for the ST. First, a side note on the memory upgrade article that appeared a few issues back. Several folks have made the comment that you should place 68-ohm resistors in series on *all* the RAS and CAS strobes coming off the MMU chip to minimize ringing and potential damage to the MMU and/or RAMS. This means that to install the resistors you have to cut board traces for the RAS and CAS lines for the memory on the board. I have been running my 1 meg upgrade since January without the resistors and have not run into this kind of problem; so the jury is out

on installing the 68-ohm resistors. I can see installing them on the second bank of the RAM, but I dislike having to cut traces on PC boards especially when they are as close as they are on the ST Motherboard. Check your local BBS or the networks; several other installation docs are floating around which you might want to compare with the one that the *Shopper* published.

Personal Pascal from Optimized System Software (1221B Kentwood Avenue, San Jose, CA 95129; (408) 446-3099; \$74.95 suggested price, not copy-protected) should be in the hands of *anyone* who wants to do *any* recreational or serious work on the ST. For starters, you get a ISO-based Pascal which generates native

code and has some good compatibility with UCSD Pascal (UNIT and BLOCK I/O missing) but its *real* selling point is its documentation—it makes an attempt to explain how to get at all of the features available in the GEM environment and it does it in a very easy, coherent and at a level that isn't condescending to the intellect, and is downright *fun* to read! (When was the last time you ever heard that a manual was *fun* to read?) To give you an example, the very first thing they tell you to do is to backup the master disk and put the original in a box marked "Danger: Radioactive Waste" in your closet. Personal Pascal runs under the GEM Desktop and includes a screen editor and linker as part of the package. To invoke the system you

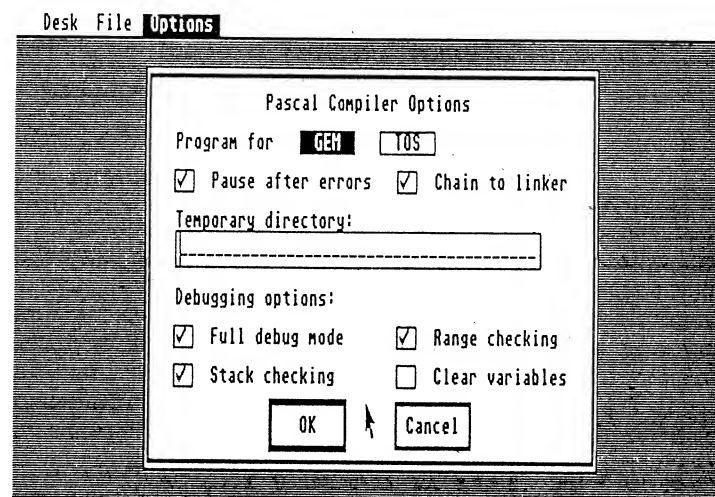


Figure 1  
Compiler Options for Personal Pascal

double-click the PASCAL.PRG file from the desktop (double-clicking any of the other .PRG files in the Personal Pascal system just returns you back to the desktop). At this point you now have a menu bar that contains the ubiquitous "Desk" followed by "Files" and "Options" drop-down menus. The Files menu allows you to invoke the editor, compiler, the linker, run a (or any) program, and Quit. The Options menu allows you to tell how the compiler and the linker are to behave and allows you to save these setups in a PASCAL.INF file (akin to the "Save Desktop" function).

The Editor in Personal Pascal uses the full screen and is a relatively nice editor to work with: those of you who have worked with WordStar will find that a number of the control sequences are supported by this editor. A nice feature of this editor is that in one keystroke it can save your source, exit the editor and invoke the compiler and proceed to compile the code you just saved.

The Compiler is a single-pass compiler that produces ".O" files which are run thru the linker to create the executable module which runs under GEM or TOS (depending on what you tell the system when you compile and link). Personal Pascal can also be told to link modules written in DRI's C or any languages that follows DRI's calling protocol. The version of the code I have made no mention of being able to write desk accessories using this language; I now understand that it is indeed possible to write accessories under Personal Pascal and that OSS has released an improved version of the language which improves the code generation process.

GEM Support. This is where OSS really shines. The manual

(and the language) makes GEM support look trivial (even though it isn't) and take you one step at a time, stepping you from the easiest portions of GEM (the alert boxes and dialog boxes) up thru event management, mouse management, windows and menu management. Plenty of examples can be found in the INFO folder on the distribution disk for you to pillage and plunder to your hearts content to further your understanding of Personal Pascal's GEM calls. Also, you can make direct GEMDOS, BIOS and XBIOS calls too.

The Bottom Line: With *Personal Pascal* and the *Abacus ST Internals* and GEM reference books, who needs Atari's developer's kit?? I have seen Personal Pascal for as low as \$55; combine that with the price of the two Abacus books at \$40 for the set you basically get the equivalent that Atari charges \$300 for. (OK, so Line \$A008 isn't documented in the Abacus Internals manual and there are some holes here and there—I got \$200 more for other software!)

VIP Professional Lite from VIP Technologies (132 Aero Camino, Santa Barbara, CA 93117; customer support phone (805) 685-3948; suggested retail \$99.95, copy protected disk) is a scaled-down version of VIP Professional (suggested retail \$179.95), a Lotus 1-2-3 work-alike. Lite has the same row and column size that 1-2-3 uses (2048x256) but lacks macros and the database facility—in essence, 1-2-3 with a lobotomy (VIP Professional gets you macros, database and 8192x256 grid size). Lite can read WKS files created by 1-2-3 and manipulate them with much the same ease as Lotus. A friend of mine saw me running VIP Lite and

continued on page 221

## New Titles Available For Atari ST Software

In a strong show of support for Atari's ST line of personal computers, third party software developers have completed hundreds of new programs. Developers include companies such as Mictron, Batteries Included, Versasoft, Philon, Stoneware, Sierra On-Line, Activision, Spinnaker and Infocom in the fields of home productivity, business, education and entertainment.

"We have a major commitment to Atari's ST line," says Batteries Included president Michael Reichmann. "Our new ST drawing program, 'DEGAS,' has been a phenomenal success. In fact, we delivered more in the initial three weeks of shipping than we anticipated for our entire first year."

Mr. Reichmann also confirmed that Batteries Included has a dozen additional ST titles in active development including an advanced word processing program, "Paper Clip Elite," and "Isgur Portfolio Series," a personal investment analysis package.

Activision has announced that its "Music Studio" MIDI music program will ship this month in addition to its popular adventure titles, and Migraph, Inc. has shipped its first ST title, "Easy Draw."

In addition to entertainment titles, many of the new titles and much of the development are in the field of business or educational applications, says Atari executive vice president

Michael V. Katz. Developers have recognized that the Atari 520ST and 1040ST are serious business or educational machines.

For example, Antic Software has introduced "Maps & Legends," an educational program for geography students. And in the area of business applications, "H&D Base," a full dBase II emulator, is now available and "dBase III-like program, shipped last month.

Versasoft has been selling to the IBM market and Richard E. Post, vice president of sales and marketing, says the company is excited about the ST version. He says, "The availability of dBase III for the ST line will open up an entirely new market to the hundreds of existing high-quality dBase applications."

At Haba Systems, president Chaz Haba says in addition to the eight productivity titles already shipping, his company will introduce up to seven more titles by the end of the second quarter. He says, "I believe the Atari ST will find its way into the business and educational community because of its low price point entry for absolutely fabulous performance."

A spokesman for Sierra On-Line, an early ST supporter with four programs currently shipping, says the company plans to ship six new ST titles, including its basic accounting

package, "PC One Write," within the next quarter. "We've had great success with the ST line," the spokesman says. "We can't seem to keep up with requests for ST software."

Gordon Monnier, president of Michtron, says his company has shipped eight titles since January and expects to have up to 24 titles by summer and more than 30 by year's end. When asked if Michtron was committed to the new Atari line, Mr. Monnier said, "We have 25 programmers working full-time on the ST line."

Among programming languages, "Lattice C," from Antic, "Personal Pascal," from OSS and "Holmes & Duckworth Forth," from Mirage have all been introduced since January.

"We've seen an excellent response to the ST line, in everything from games to sophisticated programming tools," says Mr. Katz. "The list of software titles for the ST continues to grow with more created every week. During the next quarter, we expect the number of titles to double."

A list of ST software titles is available upon request.

For additional information contact Atari Corporation, 1196 Borregas Avenue, P.O. Box 3427, Sunnyvale, CA 94088-3427.

Mention that you read about it in *Computer Shopper*. •

# ATARI

## Applying The Atari

by Jeff Brenner

This month's feature program is *BudgetMate*, our longest "Applying The Atari" program ever. The program was designed specifically in response to requests (in some cases pleadings and threats) from readers for a home budget program. We'll also take a look at some new products and reader mail.

### New Products

In the March 1986 column we learned about all of the latest memory expansion products available for the Atari 800XL. For Atari 800 owners, Magna Systems announces the RAMCHARGER, a plug-in memory expansion board. While it's not 132XE-compatible, it does offer full Axlon compatibility and gives the user up to 288K of memory for Synfile+ and Syncalc. The popular MYDOS ramdisk software is included with the board. 256K, 512K and 1 megabyte versions are available for under \$150, \$200 and \$300, respectively. Contact: Magna Systems, 147-05 Sandford Ave. Suite 4E, Flushing, NY 11355.

Datamost, Inc. is marketing a line of educational software called MindWare. Each package consists of two cassettes containing voice-tracks that sound through the television speaker and complement the visual display. Reading, Math, English, Science, Personal Skills and Business development are the topics available. They're \$24.95 per package. Contact DataMost, 21040 Nordhoff Street, Chatsworth, CA 91311.

### Reader Mail

Dear Jeff,

Q. I plan to send at least 200 letters per week (for a mail order business). I want to keep all letters on file and correspondence (who did or did not correspond). I currently have: an Atari 800XL, 1050 Disk Drive, 1027 printer.

My questions: (1) Do you think I need another printer for more speed; if so, what would you recommend? (2) Is there a buffer for this printer or other printers which you recommend? (3) Can I still exchange DOS 3 for DOS 2.5?

Stuart G. Fowler  
Anderson, South Carolina

A. The 1027 is an economical printer, but remember, it can only print 20 characters per second, so you can calculate how long it will take to print 200 letters per week. There are faster letter-quality printers available, but they are more costly, and you'll need a printer interface. Near Letter Quality (NLQ) is somewhat faster and various printer models offer both NLQ and draft modes. The Gemini SG10, for example, is very cost-effective, and features near-letter quality in addition to its draft mode. The Epson LQ series is even faster and has nicer looking output, but again, this model is more costly. Thus it all depends on how much you're willing to spend. Whatever you decide, you should visit a computer store before you buy and take a careful look at the print quality of each printer you are interested in to insure that you're satisfied with the print quality.

A printer buffer will help

Sunnyvale, CA 94088.

Dear Jeff,

Q. Recently I learned through one of the local BBS's a particular game could be modified by changing a couple of locations and the program would be enhanced to perform better. This is great...but how do you get into the locations? When the program is listed, all you get are the typical Atari arrow, hearts, squares, etc. How do you convert it to something that can be made sense of?

Gary Robinson  
Cedar, Minnesota

A. Since you are not specific about what "locations" you were directed to change, it is difficult for me to determine what you need to do. What you can do is write me again describing specifically what you were told to change and I'll help you personally. For other readers, I'll briefly discuss a couple of techniques that are involved in changing various types of programs.



Photo 1 "First Screen"

free up computer time while printing, and this would be particularly practical if you needed to change or add to each letter between printings. If you're buying an interface, you should certainly consider one with a built-in buffer. 16K, 32K, and 64K buffers are the most common sizes, and they vary in price according to memory size. The direct-connect 1027 cannot use the interface-buffer combination products since it does not require an interface.

To get DOS 2.5, send your DOS 3 disk to Atari Customer Relations, P.O. Box 61657,

For a BASIC program (and I assume your program is in BASIC since you say you can list it), you should be told a particular line to change, or shown a group of characters to change on a specific line. A "location" can't really tell you anything in a BASIC program; you need a line number. What a location can mean, though, is a memory location that you should POKE with a particular value. For example, you might be instructed to store a five in location 82, in which case you'd type POKE 82,5 before running a program. This particular poke would change the

	MAY 86 ACTUAL	JUN 86 BUDGET	JUL 86 ACTUAL
KEY DOWN	750	750	750
PRESSING	25	25	25
COMMAND KEYS	80	110	95
EDD AMOUNT	125	125	125
SUBTRACT	167	150	72
TRIGGLE LAST	150	150	150
MONTH'S BDGT	480	450	370
PRINTOUT	180	250	265
QUIT AND SAVE DATA	43	75	12
PRESS F10 TO CONTINUE	280	280	280
	280	280	280
	1000	880	880
	580	380	380
	144	280	249
TOTAL	5	5	31

Photo 2 "Menu Screen"

left-hand screen margin.

A machine language program presents an entirely different situation. In such a case you would generally need a disk utility to be able to change specified portions or bytes on a disk. For example, you might be told to alter a specific sector/byte location, or to change a series of values at a particular section/byte location. In both cases, a disk sector utility is necessary.

Dear Jeff,

Q. Your answer to H. Wayne Shiver in the *Computer Shopper* for March 1986 is not quite correct. Microperipheral modems were made by the Microperipheral Corporation in Redmond, Washington. In other words, "It ain't MPP!"

A friend here has one of these and is having the same problems finding programs to work with it. There seems to be little available information on these modems, indicating that they were not very popular or that many are confused with the name similarity.

Aaron G. Todd  
Los Angeles, California

A. Oops! You're absolutely right, Aaron. Microperipheral Corp. is not Microbits Peripheral Products. That's the problem with a lot of computer company names; they sound too much alike. Nevertheless, I apologize to Wayne Shiver and to anyone I might have caused only more confusion. You and the following reader were the only ones who caught my goof:

Dear Jeff,

Q. I was just reading your

March "Atari Help" column and I believe you misread the letter from H. Wayne Shiver of Powder Springs, GA.

He stated he owned a Microperipheral Corp. modem. This company has often been confused with the formerly named "MPP Corp." but it is a different company from Washington, not Oregon. They used to manufacture modems under the name "Microconnection" for various computers, two models for the Atari. One was an 850 connected model and the other was for use without the 850, either a joystick port or I/O daisy chain connection, I'm not sure which.

I owned an 850 connect model for years and was completely satisfied with its operation. It used its own autodial routine, not compatible with Hayes, but several public domain Amodem programs supported it, namely the earlier versions of Amodem Plus v. 1.85 and variants, up to Amodem 6.3 which was the best. Later versions like Amodem 7.1 worked fine but did support the autodial.

I suspect that Mr. Shiver may be using the non-850 version of the modem which explains why Amodem and HomeTerm give a modem error. You are correct that he needs the correct handler for his modem, but it may not be the MPP handler, although if his modem uses the joystick port, one of the MPP handlers might get his modem recognized.

continued on next



### Applying The Atari continued from page 75

Without more specific information on the model of his modem, I cannot think of any more ideas to help him. The Microperipheral Corp. produced a number of early terminal programs which they did not ship with the modem called *T Smart* and *S Smart*, and required that the proper AUTORUN.SYS handler be booted for the modem. I recommend neither program. In fact, I recommend none of the commercial terminal software for Atari. Public domain terminal software is far superior to anything you can buy on the market.

Frank Halters  
Panama City, Florida

performance. Hope this helps."

Many thanks to Ricky for writing in with this solution. Readers who want to make this modification but are uncomfortable with soldering or electronics can probably find assistance at a users' group.

### Reader Requests

Readers have been so responsive and helpful in the past in discovering software items such as genealogical programs, and hardware products, such as memory expansion boards, that beginning next month I will be including a "Reader Request" section to help readers locate hard-to-find Atari items, or even to see if such items exist. Have a particular request? Let me know.

year's worth of data. Printer output and the numeric keypad are both supported. 32K minimum memory required.

### Special Monthly Diskette

In the past I have offered diskettes containing the programs listed in this column for those who did not have the time or the desire to type in programs. This month's diskette will be a little different in that it will contain a modified version of the listed *BudgetMate*. Since I have much more freedom when I design a program that will be saved directly to diskette rather than be printed in the column, I decided to create a more powerful version of *BudgetMate* for my personal use, which I will include for my readers on this month's diskette (see end of article). In addition to the original *BudgetMate* features, the enhanced version needs no initial set-up time, allows up to 20 transaction details for each category (including income), records dollars and cents on the transaction detail screen, and features an end-of-year summary of transaction details and expenditures. Six months worth of data can be stored on a single diskette. Two diskettes, or two sides of a diskette, can hold a full year's data. The main use of these extra features is, of course, for tax purposes, since a record of all purchases, medical expenses, contributions, business expenses, etc. can be retrieved and conveniently printed by category at any time. Therefore, those who intend to use *BudgetMate* to keep detailed income/expense records should consider this version. Supplementary instructions will be included with this monthly diskette.

### Using BudgetMate

If you're typing in the program, be sure to use *Program Perfect*, since this is a long one. The listing appears under the "BUDGETMATE" heading.

When you RUN the program, the title screen soon appears (See Photo 1). If you have the Atari CX-85 numeric keypad, plug it into joystick port 1.

Next, you're asked to "INSERT THIS YEAR'S DATA DISKETTE OR A BLANK, FORMATTED DISK FOR A NEW YEAR." Since you do not yet have a data diskette for this year, insert a blank, formatted disk and press START. Use this diskette to store your budget data for the remainder of the year. At the beginning of a new year, you should use a new data diskette, unless you want to erase over the previous year's data.

Next, you're asked to enter the date. Type the month, day

and year (i.e. 6/4/86) and press RETURN. If the month is January and you are starting a new data diskette, you are asked to insert the previous year's diskette so that *BudgetMate* can load in the data from December of that year. You won't have to do this until next year.

Once the date has been entered, the appropriate files are opened or created on the data diskette and the budget screen is displayed. On the left-hand side of the screen is a menu of the commands (see Photo 2). Press ESC and the full budget screen will be displayed, with the names of any categories you have entered (see Photo 3). You can toggle between the command menu and the full screen at any

data. Then use the keyboard or the numeric keypad to enter the information. *BudgetMate* will automatically switch to its input mode and will display your entry on the screen when you press RETURN. To enter a negative number, press RETURN first and then the negative sign, otherwise pressing the negative sign would move the cursor up (since it is the same key as the up arrow).

The first thing you'll want to do is enter the categories. The same category data is used for each month's budget data, so you should avoid changing categories in which you have already entered data in the months before. You can and should, however, add categories as you discover that you need more. Move the cur-

CATEGORY	MAY 86	JUN 86	JUL 86
INCOME***	4825	4588	4358
RENT	750	750	750
ELECTRICITY	88	118	95
LIFE INSURANCE	125	125	125
CAR REPAIR	165	150	72
MEDICAL	150	150	150
CLOTHING	130	250	265
COMPUTER	45	75	12
CONTRIBUTION	200	200	200
INVESTMENTS	1000	800	800
TOTAL	1441	2000	2452

Photo 3 "Full Budget Screen"

TRANSACTION	AMOUNT
7/1/86	100.00
7/2/86	100.00
7/3/86	100.00
7/4/86	100.00
7/5/86	100.00
7/6/86	100.00
7/7/86	100.00
7/8/86	100.00
7/9/86	100.00
7/10/86	100.00
7/11/86	100.00
7/12/86	100.00
7/13/86	100.00
7/14/86	100.00
7/15/86	100.00
7/16/86	100.00
7/17/86	100.00
7/18/86	100.00
7/19/86	100.00
7/20/86	100.00
7/21/86	100.00
7/22/86	100.00
7/23/86	100.00
7/24/86	100.00
7/25/86	100.00
7/26/86	100.00
7/27/86	100.00
7/28/86	100.00
7/29/86	100.00
7/30/86	100.00
7/31/86	100.00
TOTAL	138.35

Photo 4 "Diskette Version Only"

A. Thanks for your help.

### Atari 800XL Display Fix

In April's column, in response to a letter about blurred characters on the 800XL from Alan McPherron (Pittsburgh, Pennsylvania), I asked other readers experiencing the same problem to write in. Many wrote in with similar complaints, but Ricky J. Burgett (Humboldt, Nebraska) wrote in with a solution. Ricky writes: "I am writing in reply to the question on the 800XL's poor monitor performance. Both the 800 and the 130XE have separate chrominance and luminance outputs, but the 800XLs do not have an output to the chroma pin. There is a solution for this. (See Figure 1). The chroma output is at the emitter of Q5. You need to purchase a 200 ohm resistor and solder on one side at the junction of R67 and R68. The other side goes to pin 5 on the monitor connector. You will have to extend the 200 ohm resistor by means of an insulated wire. The Chicago Atari Users Group and Antic get credit for this solution. Several in my local users group have tried this modification and have seen a marked improvement in their monitor

### PixMix Picture Diskette, Volume II

March's *PixMix* Puzzle Machine program had proved to be a very popular one, and I have been receiving numerous requests for "Volume II" of the *PixMix* picture diskette, despite the fact that I never offered a Volume II! Well, this month I'm happy to announce that Volume II is available, and best of all, it's still \$5.00 (see address at end of article). Volume II consists of several specially-centered digitized pictures and other high-resolution images that can be used with the March 1985 *PixMix* program.

### BudgetMate

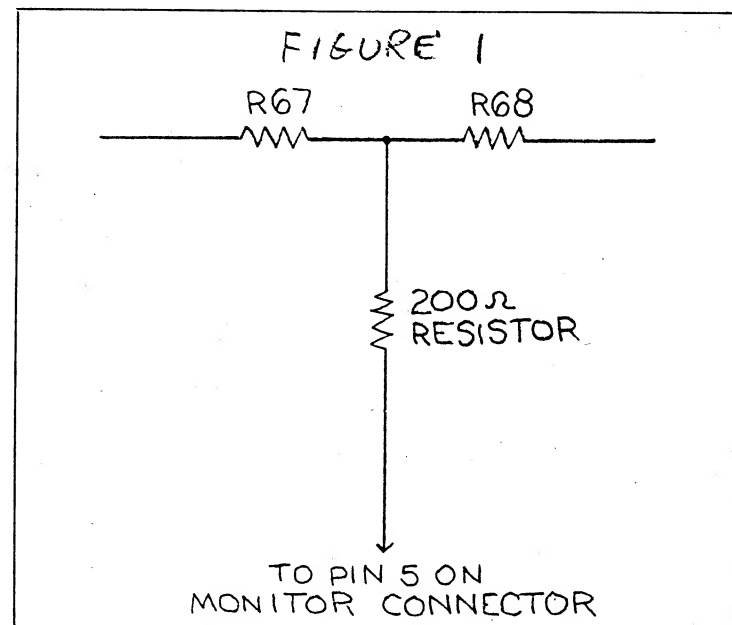
Now for this month's feature program, *BudgetMate*. *BudgetMate* allows you to define up to nineteen different expense categories (and one income category) and has features that make it simple to plan your monthly budget. For example, the actual amount spent in each expense category in the previous month is displayed as you plan the next month's budget. Additionally, the planned budget of the previous month can be copied into this month's budget. A single diskette can hold a full

time by pressing the ESC key.

The elongated cursor can be moved around the screen by using the cursor-control arrow keys. You do not need to hold down the control key to move the cursor. On the numeric keypad, the four keys on the left-side of the keypad will move the cursor up, down, left and right, respectively (from top to bottom). Changing or adding items to the screen is easy. Simply position the cursor over the data that you want to change, or over the position to which you want to add

cursor over to the category column and position it on top of the next empty "block," type the name of the category you want to place there and press RETURN. You can add more categories or change any category in the same manner. You should not change the \*\*\*INCOME\*\*\* category to an expense category, since it is treated differently by the program (the INCOME category is assigned a positive value in-

continued on page 197



## Budgetmate Program continued from page 76

## BUDGETMATE

```
STJ 10 REM BUDGETMATE
KGJ 20 REM COPYRIGHT 1986 JEFF BRENNER
YSJ 30 CYR=1980
UBJ 40 DIM INVERSE$(59),WINDOW$(130),SCR$(960),MENU$(960)
FDJ 50 DIM HEADING$(240),LAST(20),BUDGET(20),ACTUAL(20),LB(20)
VWJ 60 DIM DATE$(15),IN$(100),TEMP$(100),FILE$(20),Z$(1),Z1$(1)
JMJ 70 DIM XP(2):XP(0)=2:XP(1)=23:XP(2)=31
PYJ 80 INVERSE=ADR(INVERSE*):WINDOW=ADR(WINDOW*)
XMJ 90 DIM SP$(100):SP*=CHR$(32):SP$(100)=CHR$(32):SP$(2)=SP*
LCJ 100 DIM D$(2):D$=CHR$(156):D$(2)=CHR$(157)
ACJ 110 GOSUB 3400:GOSUB 700:OPEN #1,4,0,"K":OPEN #2,9,0,"E":POKE 559,0
HCJ 120 SETCOLOR 4,9,0:SX=85
IJJ 130 FOR I=704 TO 707:POKE I,0:NEXT I
RXJ 140 RESTORE 160:FOR I=1 TO 59:READ N:TOT=TOT+I+N
BWJ 150 INVERSE$(I)=CHR$(N):NEXT I
PEJ 160 DATA 104,104,104,170,165,88,133,208,165,89
OSJ 170 DATA 133,209,104,104,168,240,16,24,165,208
MNJ 180 DATA 105,40,133,208,165,209,105,0,133,209
QRJ 190 DATA 136,208,240,24,138,101,208,133,208,165
ONJ 200 DATA 209,105,0,133,209,104,104,168,136,177
FXJ 210 DATA 208,73,128,145,208,136,16,247,96
THJ 220 RESTORE 240:FOR I=1 TO 130:READ N:TOT=TOT+I+N
YFJ 230 WINDOW$(I)=CHR$(N):NEXT I
RGJ 240 DATA 104,104,133,212,104,133,211,104,104,170
PJJ 250 DATA 165,88,133,208,165,89,133,209,104,104
MJJ 260 DATA 168,240,29,24,165,208,105,40,133,208
MOJ 270 DATA 165,209,105,0,133,209,24,165,211,105
MAJ 280 DATA 40,133,211,165,212,105,0,133,212,136
QVJ 290 DATA 208,227,24,138,101,208,133,208,165,209
NUJ 300 DATA 105,0,133,209,138,101,211,133,211,165
NUJ 310 DATA 212,105,0,133,212,104,104,168,136,132
SDJ 320 DATA 213,104,104,170,164,213,177,208,133,214
QRJ 330 DATA 177,211,145,208,165,214,145,211,136,16
OSJ 340 DATA 241,24,165,208,105,40,133,208,165,209
LZJ 350 DATA 105,0,133,209,165,211,105,40,133,211
MHJ 360 DATA 165,212,105,0,133,212,202,208,211,96
GGJ 370 GOSUB 1670:POKE 752,1
UPJ 380 POSITION 4,5:PRINT "INSERT THIS YEAR'S DATA DISKETTE"
HSJ 390 POKE SX,4:PRINT "OR A BLANK, FORMATTED DISK FOR A"
ATJ 400 POKE SX,16:PRINT "NEW YEAR"
KAJ 410 POSITION 3,4:L=34:H=4:GOSUB 2020
BOJ 420 IF TOT<>187386 THEN GOSUB 620
URJ 430 POSITION 9,9:PRINT "PRESS START WHEN READY"
VXJ 440 A=USR(ADR(INVERSE*)),9,9,22)
UGJ 450 FOR I=1 TO 20:IF PEEK(53279)=6 THEN 470
UFJ 460 NEXT I:GOTO 440
NTJ 470 TRAP 1700:CLOSE #3:OPEN #3,4,0,"D:HEADING.DAT"
DHJ 480 INPUT #3:YEAR:GOSUB 1670:IF MONTH+DAY<>0 THEN 510
XGJ 490 POSITION 10,4:PRINT CYR+YEAR;" DATA DISKETTE"
LDJ 500 POSITION 9,3:L=21:H=1:GOSUB 2020:GOSUB 1770
BFJ 510 GOSUB 1100:GOSUB 520:GOTO 610
CUJ 520 HEADING$="" :FOR I=1 TO 19:INPUT #3:TEMP$
WCJ 530 HEADING$(LEN(HEADING$)+1)=TEMP$:NEXT I:CLOSE #3
KSJ 540 GOSUB 820:POSITION 2,2:PRINT "****INCOME****"
VKJ 550 A=USR(ADR(INVERSE*)),2,2,12)
WBJ 560 FOR I=1 TO 19:PRINT HEADING$(I*12-11,I*12):NEXT I
XJJ 570 FOR I=0 TO 19:NUM=LAST(I):POSITION 21-LEN(STR$(NUM)),I+2:PRINT NUM
VTJ 580 NUM=BUDGET(I):POSITION 29-LEN(STR$(NUM)),I+2:PRINT NUM
PGJ 590 NUM=ACTUAL(I):POSITION 37-LEN(STR$(NUM)),I+2:PRINT NUM:NEXT I
XEJ 600 COL=1:GOSUB 2750:COL=2:GOSUB 2750:COL=0:RETURN
UAJ 610 YP=2:GOSUB 1440:GOSUB 2220
TCJ 620 RESTORE 650:FOR I=1536 TO 1616:READ N:TOT=TOT+I+N:POKE I,N:NEXT I
XUJ 630 IF TOT=187386 THEN A=USR(1536):RETURN
DNJ 640 GRAPHICS 0:PRINT "PROGRAM ENTRY ERROR - CHECK DATA LINES":END
SBJ 650 DATA 104,162,6,160,10,169,7,76,92,228,174,132,2,240,5,202
CNJ 660 DATA 134,206,240,40,174,120,2,228,203,208,4,165,206,208,29,165
DNJ 670 DATA 207,240,4,198,207,240,21,230,206,134,203,230,207,173,113,2
ORJ 680 DATA 201,1,240,2,162,16,189,63,6,141,252,2,76,98,228,52
QFJ 690 DATA 24,29,27,15,51,53,48,7,31,30,26,50,34,12,191,14,155
KXJ 700 RESTORE 750:I=0:TOT=0
XBJ 710 READ NUM:IF NUM=-1 THEN 730
QXJ 720 TOT=TOT+NUM+1:POKE 1664+I,NUM:I=I+1:GOTO 710
XXJ 730 IF TOT<>13247 THEN PRINT "ERROR - CHECK LINES 3000-3060":END
POJ 740 FOR I=1767 TO 1790:POKE I,148:NEXT I:A=USR(1664):RETURN
SLJ 750 DATA 104,173,48,2,133,204,173,49,2,133,205,160,26,169,148
TZJ 760 DATA 153,230,6,136,208,250,160,0,177,204,9,128,145,204,160
QUJ 770 DATA 3,177,204,9,128,145,204,160,6,177,204,9,128,145,204
KUJ 780 DATA 200,192,28,208,245,169,197,141,0,2,169,6,141,1,2
QIJ 790 DATA 173,14,212,9,128,141,14,212,96,72,152,72,173,11,212
PLJ 800 DATA 201,7,240,18,201,8,240,14,230,206,164,204,185,231,6
NWJ 810 DATA 141,24,208,104,168,104,64,169,0,133,204,240,238,-1
MFJ 820 GOSUB 1670:DM=PEEK(559):POKE 559,0
TXJ 830 Z$="" :IF YEAR<10 THEN Z$="0"
WUJ 840 Z1$="" :IF YEAR-(MONTH=1)<10 THEN Z1$="0"
EUJ 850 POSITION 16,0:RESTORE 6500+MONTH-1:READ TEMP$,IN$
YNJ 860 PRINT CHR$(8):TEMP$(1,3):CHR$(32):Z1$:YEAR-(MONTH=1):CHR$(8);
KOJ 870 FOR I=1 TO 2
OVJ 880 PRINT CHR$(136):IN$(1,3):CHR$(32):Z$:YEAR:CHR$(8):NEXT I
XTJ 890 A=USR(ADR(INVERSE*)),17,0,23)
IEJ 900 POSITION 4,1:PRINT "CATEGORY"
VKJ 910 A=USR(ADR(INVERSE*)),2,1,13)
ETJ 920 POSITION 1,22:PRINT CHR$(2):"ESC FOR MENU":CHR$(22)
XKJ 930 A=USR(ADR(INVERSE*)),2,22,12)
MGJ 940 POSITION 15,1:PRINT CHR$(8):"ACTUAL":CHR$(8):CHR$(136);
VUJ 950 PRINT "BUDGET":CHR$(8):CHR$(136):"ACTUAL":CHR$(8)
XRJ 960 A=USR(ADR(INVERSE*)),16,1,23)
WWJ 970 IN$=CHR$(2):IN$(2,13)=SP$:IN$(14)=CHR$(22)
WHJ 980 TEMP$=CHR$(130):TEMP$(2,8)=SP$:TEMP$(7,7)=CHR$(150)
SCJ 990 POSITION 1,1:PRINT CHR$(2):POSITION 14,1:PRINT CHR$(22)
CUJ 1000 FOR I=1 TO 20:POKE 85,1:PRINT IN$:TEMP$:TEMP$:TEMP$:NEXT I
TYJ 1010 FOR X=15 TO 35 STEP 8:POSITION X,22
MQJ 1020 FOR I=1 TO 7:PRINT CHR$(13):NEXT I:NEXT X
IJJ 1030 A=USR(1664):POKE 1767,144:POKE 1768,144:POKE 1769,144:POKE 1770,144
QCJ 1040 POKE 1769,144:FOR I=1770 TO 1788 STEP 2:POKE I,146:NEXT I
WHJ 1050 POKE 53260,213:POKE 53265,255
OIJ 1060 FOR I=704 TO 706:POKE I,144:NEXT I
MMJ 1070 POKE 53252,104:POKE 53253,136:POKE 53254,168:POKE 53255,200
UWJ 1080 POKE 53248,48:POKE 53261,255
```

```
GNJ 1090 POKE 559,DM:RETURN
XHJ 1100 FILE$="D:MONTH":FILE$(LEN(FILE$)+1)=STR$(MONTH)
YIJ 1110 TRAP 1390:CLOSE #4:OPEN #4,4,0,FILE$:INPUT #4:ACTUAL:INPUT #4:BUDGET
DDJ 1120 FOR I=0 TO 19:INPUT #4:TMP:ACTUAL(I)=TMP:NEXT I
DFJ 1130 FOR I=0 TO 19:INPUT #4:TMP:BUDGET(I)=TMP:NEXT I
DBJ 1140 CLOSE #4:IF MONTH=1 THEN 1210
QAJ 1150 IN$="D:MONTH":IN$(8)=STR$(MONTH-1)
FYJ 1160 TRAP 1200:OPEN #4,4,0,IN$:INPUT #4:LAST:INPUT #4:LB
XEJ 1170 FOR I=0 TO 19:INPUT #4:TMP:LAST(I)=TMP:NEXT I
QVJ 1180 FOR I=0 TO 19:INPUT #4:TMP:LB(I)=TMP:NEXT I
CXJ 1190 RETURN
EBJ 1200 FOR I=0 TO 19:LAST(I)=0:LB(I)=0:NEXT I:LB=0:LAST=LB:RETURN
LSJ 1210 TY=PEEK(84)
NRJ 1220 POSITION 2,TY:PRINT D$;"DO YOU HAVE DISK FOR ";CYR+YEAR-1;"?";
DAJ 1230 GET #1,N:PRINT CHR$(N);
WGJ 1240 IF N<>78 AND N<>89 THEN 1210
IGJ 1250 IF N=78 THEN RETURN
MBJ 1260 POKE 752,1:PRINT :PRINT :POKE 85,6:PRINT "INSERT LAST YEAR'S DISKETTE"
JAJ 1270 POKE 85,5:PRINT "PRESS START WHEN READY TO LOAD";
OZJ 1280 A=USR(ADR(INVERSE*)),11,PEEK(84),5)
TOJ 1290 IF PEEK(53279)<>6 THEN 1290
FEJ 1300 TRAP 1380:CLOSE #4:OPEN #4,4,0,"D:MONTH12"
XFJ 1310 INPUT #4:LAST:INPUT #4:LB
XBJ 1320 FOR I=0 TO 19:INPUT #4:TMP:LAST(I)=TMP:NEXT I
MXJ 1330 FOR I=0 TO 19:INPUT #4:TMP:LB(I)=TMP:NEXT I:CLOSE #4
MCJ 1340 PRINT :PRINT :PRINT :POKE 85,9:PRINT "REPLACE NEW DISKETTE"
OHJ 1350 POKE 85,8:PRINT "PRESS START WHEN READY";
ASJ 1360 A=USR(ADR(INVERSE*)),14,PEEK(84),5):POKE 85,8:L=22:GOSUB 1940
TMJ 1370 IF PEEK(53279)<>6 THEN 1370
CYJ 1380 RETURN
SPJ 1390 CLOSE #4:OPEN #4,8,0,FILE$
PDJ 1400 FOR I=0 TO 41:PRINT #4:0
UNJ 1410 IF I<20 THEN BUDGET(I)=0:ACTUAL(I)=0
VUJ 1420 NEXT I:CLOSE #4
FFJ 1430 GOTO 1140
RXJ 1440 MENU$=CHR$(0):MENU$(960)=CHR$(0):MENU$(2)=MENU$
VXJ 1450 POSITION 0,0:POKE 752,1:PRINT CHR$(30):CHR$(31);
CNJ 1460 A=USR(ADR(WINDOW*)),ADR(MENU*),2,1,12,22)
KOJ 1470 POSITION 2,1:PRINT "COMMAND MENU":A=USR(ADR(INVERSE*)),2,1,12)
LXJ 1480 POSITION 2,2:PRINT "HOLD CONTROL":POKE 85,4:PRINT "KEY DOWN"
GRJ 1490 POKE 85,6:PRINT "WHEN":POKE 85,4:PRINT "PRESSING"

JIJ 1500 POKE 85,2:PRINT "COMMAND KEYS"
ADJ 1510 POSITION 3,8:PRINT CHR$(193);"DD AMOUNT":PRINT
GOJ 1520 PRINT CHR$(32):CHR$(211);"UBTRACT":PRINT
YEJ 1530 PRINT CHR$(32):CHR$(212);"OGGLE LAST":PRINT "MONTH'S BDGT"
ICJ 1540 PRINT CHR$(32):CHR$(208);"RINTOUT":PRINT
MPJ 1550 PRINT CHR$(32):CHR$(209);"UIT AND"
VMJ 1560 PRINT CHR$(32);"SAVE DATA"
QLJ 1570 PRINT :PRINT CHR$(32);"PRESS ESC"
XZJ 1580 A=USR(ADR(INVERSE*)),9,19,3)
YTJ 1590 PRINT "TO CONTINUE":POSITION 0,0:PRINT CHR$(30):CHR$(31);
ABJ 1600 A=USR(ADR(INVERSE*)),2,22,12)
RFJ 1610 POKE 764,255:POKE 1769,148
QWJ 1620 IF PEEK(764)=255 THEN 1620
CMJ 1630 A=USR(ADR(WINDOW*)),ADR(MENU*),2,1,12,22)
JBJ 1640 IF PEEK(764)=28 THEN POKE 764,255
PFJ 1650 A=USR(ADR(INVERSE*)),XP(COL),YP,7+5*(COL=0):POKE 1769,144:RETURN
AUJ 1660 A=USR(ADR(WINDOW*)),ADR(MENU*),2,1,12,22):GOTO 1610
WYJ 1670 GRAPHICS 0:POKE 711,144:POKE 623,17:POKE 710,144:POKE 712,144
NIJ 1680 POKE 16,64:POKE 53774,64
DCJ 1690 RETURN
QQJ 1700 IF PEEK(195)=170 THEN 1720
RRJ 1710 PRINT "ERROR #":PEEK(195):GOTO 370
YWJ 1720 POKE 84,12:PRINT "OPEN NEW FILE ON THIS DISKETTE (Y/N)?"
IUJ 1730 T=PEEK(SX):L=37:POSITION 2,12:GOSUB 1940
RRJ 1740 GET #1,N:IF N<>89 AND N<>78 THEN 1720
UXJ 1750 IF N=78 THEN 370
HAJ 1760 GOSUB 1770:GOTO 1870
TUJ 1770 POSITION 2,14:PRINT D$;"ENTER THE DATE (ex: 5/8/86): ";T=PEEK(SX)
FHJ 1780 POSITION 2,14:L=28:GOSUB 1940
TQJ 1790 TRAP 1770:INPUT #16:DATE$
AHJ 1800 MONTH=VAL(DATE$):GOSUB 1810:GOTO 1830
KYJ 1810 IF DATE$(2,2)="/" THEN DATE$=DATE$(3):RETURN
MJJ 1820 DATE$=DATE$(4):RETURN
TPJ 1830 DAY=VAL(DATE$)
IHJ 1840 GOSUB 1810
VYJ 1850 YEAR=VAL(DATE$):IF YEAR<0 OR YEAR>99 THEN 1770
DBJ 1860 RETURN
WBJ 1870 GOSUB 1670:POSITION 9,5:PRINT "OPENING FILE - STAND BY"
HFJ 1880 POKE 752,1
MLJ 1890 POSITION 8,4:L=25:H=1:GOSUB 2020
RPJ 1900 CLOSE #3:OPEN #3,8,0,"D:HEADING.DAT"
LLJ 1910 PRINT #3:YEAR:FOR I=1 TO 19:PRINT #3:SP$(1,12):NEXT I
DKJ 1920 CLOSE #3
DTJ 1930 GOTO 470
FEJ 1940 IF KBH THEN POKE 764,KBH:KBH=0:GOTO 2010
VJJ 1950 H=PEEK(SX):POKE 764,255:POKE 752,1:PRINT CHR$(30):CHR$(31);
NTJ 1960 POKE SX,H:FOR I=1 TO 6
FXJ 1970 A=USR(ADR(INVERSE*)),PEEK(85),PEEK(84),L)
NCJ 1980 FOR W=1 TO 3
HNJ 1990 IF I/2=INT(I/2) AND PEEK(764)<>255 THEN 2010
TMJ 2000 NEXT W:NEXT I

KWJ 2010 POKE 752,0:POKE SX,T:PRINT CHR$(30):CHR$(31):RETURN
DOJ 2020 XI=PEEK(85):YI=PEEK(84):PRINT CHR$(17);
HAJ 2030 FOR I=1 TO L-2:PRINT CHR$(18):NEXT I:PRINT CHR$(5)
EYJ 2040 FOR J=1 TO H:POKE 85,XI:PRINT CHR$(124);
AYJ 2050 POKE SX,XI+L-1:PRINT CHR$(124):NEXT J
YRJ 2060 POKE SX,XI:PRINT CHR$(26);
HCJ 2070 FOR I=1 TO L-2:PRINT CHR$(18):NEXT I:PRINT CHR$(3)
CWJ 2080 RETURN
SIJ 2090 DATA DECEMBER
OXJ 2100 DATA JANUARY
TQJ 2110 DATA FEBRUARY
KGJ 2120 DATA MARCH
KUJ 2130 DATA APRIL
FGJ 2140 DATA MAY
IEJ 2150 DATA JUNE
IXJ 2160 DATA JULY
ORJ 2170 DATA AUGUST
```

program continued on page 197

## Applying The Atari continued from page 76

ternally while the expense categories are assigned negative values).

The other two columns you can change or add to are this month's BUDGET and ACTUAL columns. Numeric values for each category can range from -9,999 to 99,999. The total monthly balance can range from -99,999 to 999,999. Your first task is to design a balanced budget that will give you a zero or positive balance (the balance is displayed at the bottom of the column). Then, as the month progresses, use the ACTUAL column to record the actual expenditures that you make over the course of the month. By comparing the ACTUAL column to the BUDGET column, you can see exactly where you need to cut back, and where you can spend more freely. On the diskette version of *BudgetMate*, changes or additions to the AC-

TUAL column will bring you to a detail screen (see Photo 4) where you can record the actual transaction.

Last month's ACTUAL column will be empty when you first start using the program, but after the first month this column will show you what you actually spent in each category (and how much you earned in the income category) in the previous month. This will help you to plan a much more easily adhered-to budget for the current month, since last month's actual figures should give you a good estimation of the current month's requirements for most of the categories.

Five control commands are used for your budget planning and actual record keeping. Press CONTROL-A to add a value to an existing one. On the numeric keypad, the minus sign (-) has been redefined to be the CONTROL-A key, since this feature is used often. For example, if you just went

out and bought \$100 worth of clothing, you would move the cursor down to the CLOTHING category line and then over to the ACTUAL column. Then you would press CONTROL-A (or - on the keypad), type 100 and press RETURN. 100 dollars will be automatically added to the existing amount in that category. The subtract command, CONTROL-S, does just the opposite. The add and subtract commands can be used on both the BUDGET and the ACTUAL columns.

The CONTROL-T command allows you to switch in last month's budget. Thus, if you were able to adhere to last month's budget well, you can copy it for this month's budget and modify whatever amounts are necessary. Pressing CONTROL-T again will return the original current budget, should you change your mind once you see last month's budget.

The CONTROL-P com-

mand gives you a printout of the budget screen. You can obtain a hardcopy of any month's data by loading in that month's data (enter a date in that month when asked to type in the current date). Then use the CONTROL-P command to print out the budget screen.

The CONTROL-Q command is the quit command. It is extremely important that you remember to press CONTROL-Q once you have finished adding/changing data, since this command tells *BudgetMate* to save all changes and additions to diskette. If you forget to press the CONTROL-Q command and turn off your computer, you will lose whatever additions you made for that day, so always remember to use this command when you are finished. You can use *BudgetMate* on a daily, weekly, or monthly basis, depending on how often you need to add to the expense categories and how much you want to monitor your budget.

## Next Month

We'll learn how *BudgetMate* works, plus we'll enter some reader-modified utility programs.

Readers' questions, comments and contributions are welcome. Please enclose a self-addressed, stamped envelope (SASE) for a personal reply.

The *BudgetMate* diskette is available from the author for \$7.00, postpaid. Please make checks payable to Jeff Brenner; and specify your disk drive model.

"Program Perfect" is a utility used to check for typing errors while entering programs from this column. Readers may send \$5.00 for a diskette or a SASE for a listing of this program.

Address all correspondence to: Jeff Brenner, "Applying The Atari 6/86", c/o Computer Shopper, P.O. Box F, Titusville, FL 32781-9990. ●

## Budgetmate Program continued from page 196

```

WQJ 2180 DATA SEPTEMBER
QUJ 2190 DATA OCTOBER
WFJ 2200 DATA NOVEMBER
SCJ 2210 DATA DECEMBER
AZJ 2220 COL=0:POKE 764,255
NJJ 2230 A=USR(ADR(INVERSE*)),XP(COL),YP,7+5*(COL=0))
NDJ 2240 SOUND,0,0,0
HHJ 2250 KB=PEEK(764):IF KB=255 THEN 2250
CCJ 2260 POKE 764,255:IF ER=0 THEN 2280
SWJ 2270 POSITION 0,23:ER=0:PRINT SP*(1,35);
VYJ 2280 SOUND 0,8,12,4:POKE 53768,64
YTJ 2290 IF KB=12 THEN 2450
NHJ 2300 A=USR(ADR(INVERSE*)),XP(COL),YP,7+5*(COL=0))
IXJ 2310 IF KB=7 OR KB=135 THEN COL=COL+1:IF COL>2 THEN COL=0
EGJ 2320 IF KB=6 OR KB=134 OR KB=52 THEN COL=COL-1:IF COL<0 THEN COL=2
EMJ 2330 IF KB=14 OR KB=142 THEN YP=YP-1:IF YP<2 THEN YP=21
EQJ 2340 IF KB=15 OR KB=135 THEN YP=YP+1:IF YP>21 THEN YP=2
OFJ 2350 IF KB=28 THEN GOSUB 1660:GOTO 2250
UWJ 2360 IF KB=191 AND COL THEN 3240
UYJ 2370 IF KB=190 AND COL THEN 3350
SFJ 2380 IF KB=175 THEN GOSUB 2870
RRJ 2390 IF KB=138 THEN GOSUB 3000
ROJ 2400 IF KB=173 THEN GOSUB 3170
YPJ 2410 IF KB>127 OR KB=6 OR KB=7 OR KB=14 OR KB=15 OR KB=52 THEN 2230
GPJ 2420 KBH=KB:A=USR(ADR(INVERSE*)),XP(COL),YP,7+5*(COL=0))
FLJ 2430 GOTO 2450
FIJ 2440 GOTO 2230
LDJ 2450 SCR*(1)=CHR*(0):SCR*(960)=CHR*(0):SCR*(2)=SCR*
YXJ 2460 A=USR(ADR(WINDOW*)),ADR(SCR*),1,22,39,1)
AYJ 2470 IF COL=0 THEN 2640
CBJ 2480 POSITION 2,22:PRINT D*;"NEW VALUE: ";:T=PEEK(85)
EWJ 2490 POSITION 2,22:L=10:GOSUB 1940
YTJ 2500 TRAP 2730:INPUT #16;VALUE:VALUE=INT(VALUE+0.5)
VWJ 2510 POKE 752,1:POSITION 0,0:PRINT CHR*(30);CHR*(31);
CGJ 2520 IF VALUE<-9999 OR VALUE>99999 THEN 2480
RIJ 2530 A=USR(ADR(INVERSE*)),XP(COL),YP,7)
OSJ 2540 FL=1:IF YP=2 THEN FL=-1
DJJ 2550 IF COL>1 THEN 2570
IHJ 2560 BUDGET=BUDGET+FL*BUDGET(YP-2)-FL*VALUE:BUDGET(YP-2)=VALUE
DOJ 2570 IF COL>2 THEN 2590
IFJ 2580 ACTUAL=ACTUAL+FL*ACTUAL(YP-2)-FL*VALUE:ACTUAL(YP-2)=VALUE
OXJ 2590 POSITION XP(COL)+1,YP
EXJ 2600 I=LEN(STR*(VALUE))
SZJ 2610 IF I<5 THEN PRINT SP*(1,5-I);VALUE;
UWJ 2620 IF I=5 THEN PRINT VALUE;
FPJ 2630 GOTO 2740
NAJ 2640 POSITION 2,22:PRINT D*;"NEW CATEGORY: ";:T=PEEK(SX)
EXJ 2650 POSITION 2,22:L=13:GOSUB 1940
FRJ 2660 INPUT #16;IN$:POKE 752,1:POSITION 0,0:PRINT CHR*(30);CHR*(31);
LJJ 2670 IF LEN(IN$)=0 THEN 2730
HJJ 2680 IF LEN(IN$)>12 THEN IN$=IN$(1,12)
DTJ 2690 IF LEN(IN$)<12 THEN IN$=LEN(IN$)+1,12)=SP*
MBJ 2700 HEADING*(YP-2)*12-11,(YP-2)*12)=IN$
EHJ 2710 POSITION XP(COL),YP:PRINT IN$;:POSITION 0,0:PRINT CHR*(30);CHR*(31);
FPJ 2720 GOTO 2740
NOJ 2730 A=USR(ADR(INVERSE*)),XP(COL),YP,7+5*(COL=0))
YGJ 2740 A=USR(ADR(WINDOW*)),ADR(SCR*),1,22,39,1):GOSUB 2750:GOTO 2230
IFJ 2750 POSITION XP(COL)-1,22:IF COL>1 THEN 2800
LDJ 2760 I=LEN(STR*(BUDGET))+2
UKJ 2770 IF I<9 THEN PRINT SP*(1,9-I);BUDGET;:GOTO 2850
WDJ 2780 IF I=9 THEN PRINT BUDGET;:GOTO 2850
FXJ 2790 GOTO 2840
NWJ 2800 IF COL>2 THEN RETURN
KYJ 2810 I=LEN(STR*(ACTUAL))+2
UFJ 2820 IF I<9 THEN PRINT SP*(1,9-I);ACTUAL;:GOTO 2850
VYJ 2830 IF I=9 THEN PRINT ACTUAL;:GOTO 2850
SOJ 2840 PRINT CHR*(32);"OVRFLW";

```

```

EMJ 2850 POSITION 15,22:PRINT "TOTALS:":A=USR(ADR(INVERSE*)),15,22,7)
RVJ 2860 POKE 752,1:POSITION 0,0:PRINT CHR*(30);CHR*(31);:RETURN
FOJ 2870 TRAP 2970:POKE 54286,64:POKE 710,144
EBJ 2880 CLOSE #4:OPEN #4,0,"D:HEADING.DAT":PRINT #4;YEAR
EVJ 2890 FOR I=1 TO 19:PRINT #4;HEADING*(I*12-11,I*12):NEXT I
SNJ 2900 CLOSE #4:OPEN #4,0,FILE#
OZJ 2910 PRINT #4;ACTUAL:PRINT #4;BUDGET
FGJ 2920 FOR I=0 TO 19:PRINT #4;ACTUAL(I):NEXT I
FIJ 2930 FOR I=0 TO 19:PRINT #4;BUDGET(I):NEXT I
DOJ 2940 CLOSE #4
WGJ 2950 FOR I=53252 TO 53255:POKE I,0:NEXT I:POKE 53248,0
ISJ 2960 POP:GRAPHICS 0:END
TEJ 2970 POKE 710,148:POKE 54286,192
MVJ 2980 POSITION 2,23:PRINT "SAVING ERROR #";PEEK(195);:ER=1
KSJ 2990 POSITION 2,23:L=17:T=0:GOSUB 1940:RETURN
LCJ 3000 POKE 54286,64:TRAP 3140
VKJ 3010 POKE 752,1:POSITION 0,0:PRINT CHR*(30);CHR*(31);
AHJ 3020 A=USR(ADR(INVERSE*)),15,22,7)
NUJ 3030 CLOSE #4:OPEN #4,0,0,"P:"
KOJ 3040 FOR Y=0 TO 22:IF Y<2 THEN A=USR(ADR(INVERSE*)),0,Y,40)
PXJ 3050 POSITION 2,Y:INPUT #2;IN$:A=USR(ADR(INVERSE*)),0,Y,40)
FOJ 3060 IF Y>1 AND Y<22 THEN 3110
PGJ 3070 FOR I=1 TO LEN(IN$):A=ASC(IN$(I,I))
VQJ 3080 IF A>31 AND A<97 THEN PRINT #4;CHR*(A);:GOTO 3100
ATJ 3090 PRINT #4;CHR*(32);
URJ 3100 NEXT I:PRINT #4:GOTO 3120
JLJ 3110 IN$(13,14)=SP*:IN$(20,22)=SP*:IN$(28,30)=SP*:PRINT #4;IN$
DCJ 3120 IF Y>1 THEN A=USR(ADR(INVERSE*)),0,Y,40)
XFJ 3130 NEXT Y:POKE 54286,192:A=USR(ADR(INVERSE*)),15,22,7):RETURN
IKJ 3140 POKE 54286,192:A=USR(ADR(INVERSE*)),15,22,7)
SSJ 3150 POSITION 2,23:PRINT "PRINTING ERROR #";PEEK(195);:ER=1
KKJ 3160 POSITION 2,23:T=0:L=19:GOSUB 1940:RETURN
PIJ 3170 FOR I=0 TO 19:TMP=LB(I):LB(I)=BUDGET(I):BUDGET(I)=TMP
DAJ 3180 A=USR(ADR(INVERSE*)),24,1+2,5)
NRJ 3190 POSITION 24,1+2:IF TMP=0 THEN J=1:GOTO 3210
YLJ 3200 J=LEN(STR*(TMP))
JMJ 3210 IF J<5 THEN PRINT SP*(1,5-J);TMP:GOTO 3230
NDJ 3220 IF J=5 THEN PRINT TMP
QIJ 3230 NEXT I:TMP=LB:LB=BUDGET:BUDGET=TMP:COL=1:GOTO 2750
LBJ 3240 SCR*(1)=CHR*(0):SCR*(960)=CHR*(0):SCR*(2)=SCR*
YVJ 3250 A=USR(ADR(WINDOW*)),ADR(SCR*),1,22,39,1)
DFJ 3260 POSITION 2,22:PRINT D*;"ADD WHAT VALUE: ";:FL=1:T=PEEK(SX)
EYJ 3270 POSITION 2,22:L=15:GOSUB 1940
VDJ 3280 VALUE=0:TRAP 3290:INPUT #16;VALUE:VALUE=INT(VALUE+0.5)
WBJ 3290 POKE 752,1:POSITION 0,0:PRINT CHR*(30);CHR*(31);
NSJ 3300 IF COL=1 THEN VALUE=BUDGET(YP-2)+VALUE*FL
NTJ 3310 IF COL=2 THEN VALUE=ACTUAL(YP-2)+VALUE*FL
QOJ 3320 POSITION 2,23:PRINT SP*(1,14);:POSITION 2,23
XNJ 3330 IF VALUE<-9999 OR VALUE>99999 THEN PRINT "VALUE TOO BIG";:GOTO 3260
FMJ 3340 GOTO 2540
LDJ 3350 SCR*(1)=CHR*(0):SCR*(960)=CHR*(0):SCR*(2)=SCR*
YXJ 3360 A=USR(ADR(WINDOW*)),ADR(SCR*),1,22,39,1)
UZJ 3370 POSITION 2,22:PRINT D*;"SUBTRACT WHAT VALUE: ";:FL=-1:T=PEEK(SX)
EWJ 3380 POSITION 2,22:L=20:GOSUB 1940
FTJ 3390 GOTO 3280
EJJ 3400 DATA 124,102,120,62,126,126,99,24,126,126,102,102,108,96,96,24
DPJ 3410 DATA 119,60,24,96,124,102,102,96,124,24,127,102,24,124,102,102
CHJ 3420 DATA 102,110,96,24,107,102,24,96,102,102,108,102,96,24,99,126
YHJ 3430 DATA 24,96,124,126,120,62,126,24,99,102,24,126
WFJ 3440 GRAPHICS 4:SETCOLOR 4,9,0:SETCOLOR 0,9,10
COJ 3450 S=PEEK(88)+256*PEEK(89)+80:DL=PEEK(560)+256*PEEK(561)
HFJ 3460 POKE 559,0
MGJ 3470 RESTORE 3400:FOR I=0 TO 59:READ N:POKE S+I,N:NEXT I:POKE 559,34
PHJ 3480 POKE DL+23,6:POKE DL+24,6:POKE 87,1
XGJ 3490 IN$="COPYRIGHT 1986":POSITION 3,9:PRINT #6;IN$
ULJ 3500 IN$="JEFF BRENNER":POSITION 4,10:PRINT #6;IN$
HCJ 3510 POKE 752,1:PRINT SP*(1,9);"Please stand by..."
DMZ 3520 RETURN

```



### Hacking Atari ST continued from page 73

when I want to use Mince to edit a file named ART.APR, I type the following at the system prompt:

**MINCE ART.APR <cr>**

That way, the editor loads into memory, and it automatically loads the file ART.APR into memory. The desk top used on the ST uses a graphics interface, you load a program by double clicking your mouse on it, so you have no chance to type in command line arguments. Since command line arguments are so useful, the ST provides the alert box for command line arguments for the programs that use it.

It just so happens that there is a version of Mince that runs on the ST, so of course, I use it for text editing with the ST. On the ST I double click on MINCE.TTP, and the alert box appears. I can then type ART.APR and press the return key and viola, MINCE is loaded into the machine and it loads the file ART.APR.

When you use the install application option, you tell the computer which kind of environment to prepare for the program. The information is saved on the disk and is used by the computer when it tries to load a program.

I like to change the extent of the program instead of installing it. That way, when you copy the program onto another

disk, the computer knows what kind of environment to prepare without you having to install the application on the new disk.

Since I believe one of the best ways to learn things is to roll up your sleeves and get your hands dirty, I have provided a simple program that you can change the extent of to see how it effects the display. The program is on a disk, along with several other small useful programs for the ST. I will tell you how to get the disk a little later in this column. If you don't want to order the disk, you can use any program that does not use the mouse for interfacing. The program itself is:

```
-include <stdio.h>
#include <osbind.h>
```

```
main()
printf("/n/n/nThis is a demo.
/n"); delay(1000);
}
```

Compile the program and run it with an extent of .PRG. Change the extent with the SHOW INFORMATION option to .TOS and run it again. Change the extent to .TTP and run it one more time.

The AUTO folder is a special folder that can appear on ST disks. The reason the AUTO folder is special is that any program that appears in the AUTO folder is executed right after booting, before you get to the desk top. The AUTO folder can be used to run small

customizing programs that you always want executed. Most of my friends have a RAM DISK program in the AUTO folder of their boot disk. I also have several small programs that I normally keep in my AUTO folder.

The first program I'd like to go over is one that I should have written a year ago, but didn't get around to writing until the first of this year. I have a Volksmodem 12 smart modem hooked up to my ST. I tend to forget to turn it off when I am done using it, so people that call me are often greeted with an ear-shattering shrill. The modem will answer the phone right after the first ring, so I don't have a chance to turn it off before it mounts its attack on my friends. The solution is a small program in the AUTO folder.

NOTONE.PRG is a small program using the Beaconout function that was covered in last month's article to perform a useful function. Demonstration programs are always so much nicer when they do something useful! Hayes compatible smart modems can be commanded to not answer the phone by sending them the string "AT S0=0<cr>". By putting a program in the AUTO folder that sends this string to the modem, you set the modem to never answer the phone every time you boot your computer.

Before we get into the pro-

gram itself, I will need to go over the Rsconf() extended bios call. The Rsconf call is used to configure the serial port on the ST. The call takes 6 parameters! The first parameter is the baud rate. The ST can run at any of 16 baud rates. The codes used for baud rate settings appear in Table I.

Baud rate	Rsconf code
19200	0
9600	1
4800	2
3600	3
2400	4
2000	5
1800	6

1200	7
600	8
300	9
200	10
150	11
134	12
110	13
75	14
50	15

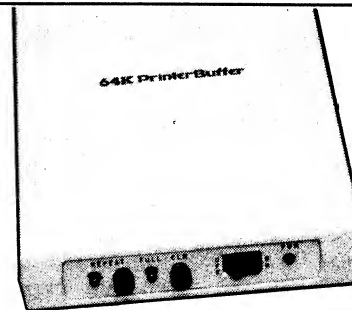
Table I

Baud rate codes for the Rsconf() call.

The second parameter used determines the flow control used. There are four flow control settings; 0—No flow control; 1—Xon/Xoff; 2—RTS/

continued on page 216

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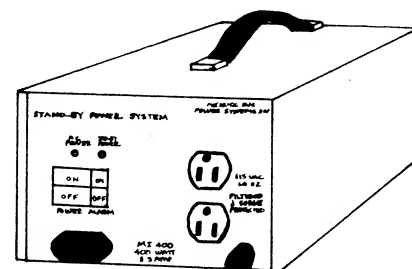
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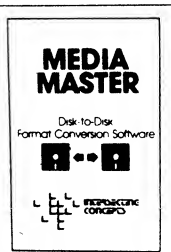


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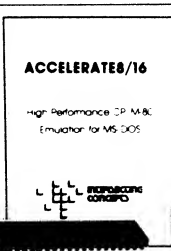
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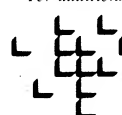
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## Hacking Atari ST continued from page 214

CTS; 3—Xon/Xoff and RTS/CTS. The flow control determines when (if ever) the serial transmission of data is inhibited. Xon/Xoff are two character (Control S and Con-

trol Q) that can be used to control transmission of serial data. If the ST is set up for Xon/Xoff flow control, when the ST receives a Control Q from whatever it is talking to, it will stop sending data until it receives a Control S. Some

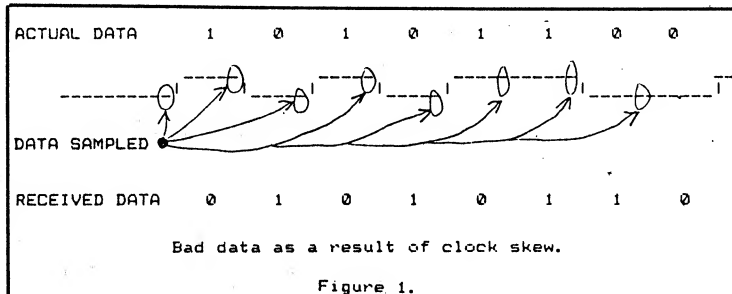


Figure 1.

BIT #	FUNCTION	ACTION
7	clock mode	/1 or /16
6	word length	
5	word length	5,6,7 or 8 data bits
4	stop/start bits	0 or 1 start bit
3	stop/start bits	0,1,1 & 1/2 or 2 stop bits
2	parity enable	
1	even/odd parity	selects even or odd parity
0	not used	

Table II  
UCR register bits



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printers that use a serial interface use the Xon/Xoff protocol to control the computer.

Most printers that use a serial interface use the RTS/CTS lines of the RS-232C connector to tell the computer when the printer is busy, and can't receive any more characters.

If you are hooking a modem to the serial port, you should use the No flow control option.

After the baud rate and flow control parameters, the next four parameters are values that set registers in the MFP 68901. The MFP 68901 is a complex chip that performs many functions within the ST. I will be covering sections of the 68901 in several columns because it is just too complex to cover in a single column.

The four parameters are used to set the value of the ucr, rsr, tsr, and the scr. The ucr is the USART control register. This is an 8 bit register controls the clock mode, the word length, the start and stop bit configuration and parity. The register layout is shown in Table II.

Bit 7 (The most significant bit) controls the divisor ratio for the clock signals for the transmitter and receiver sections of the 68901. If bit 7 is a 0, then the data is clocked into the receiver and out of the transmitter at the clock rate. When bit 7 is a 1, then the data is clocked into and out of the 68901 at 1/16 of the clock rate.

You may be wondering why you would want to use a clock frequency 16 times higher than the data transmission rate. When the higher clock frequency is used, the receiving portion of the USART part of the 68901 can be a little more sophisticated.

With a divide by 1 clock, the USART looks at the data on the rising edge of the clock pulse. If the clock is a little out of sync, you can receive bad data. Since the data is sampled only once at the leading edge of the clock, external circuitry must synchronize the receive clock to the clock being used by the transmitter.

If for some reason the receiving clock gets a little out of sync with the transmitting clock, you get a whole string of bad data until the external circuitry can get the clocks re-synchronized. See Figure 1.

When the divide by 16 option is being used, the USART will start counting as soon as it detects an edge. Four clock pulses after the edge, the data line is sampled. In addition to more reliable data sampling, the divide by 16 mode allows the USART to tolerate some "jitter" in the data without getting messed up. When the data

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**Hacking Atari ST****continued from page 216**

line changes state, the counter is reset to 0. That way, if one of the data pulses is only 14 clocks long, the USART will resynchronize on the next data transition by resetting to 0 even though it had only counted to 13. (Computer scientists always count from 0)

Bits 6 and 5 control the number of data bits. Unlike some other USARTs, the 68901 will never transmit less than 8 bits. If you request 5 bits, the 68901 will send 5 data bits and 3 0s to bring the total to 8 data bits. The settings of bits 6 and 5 to use are:

**Bit 6 Bit 5 Length**  
(active data bits)

0	0	8
0	1	7
1	0	6
1	1	5

Bits 4 and 3 are used together to control the number of start and stop bits. The values of these bits are:

Bit 4	Bit 3	Stop	Start
0	0	0	0
0	1	1	1
1	0	1½	1
1	1	2	1

Bit 2 is the parity enable bit. If this bit is 0, then the 68901 will not add a parity bit to the data, it also does not check the parity of the received data. When bit 2 is a 1, the USART checks the parity of each received character and it will also add a parity bit to each data word transmitted.

Bit 1 is the parity bit. If bit 2 is a 0, then this bit does not control anything. If bit 2 is a 1, then bit 1 selects even or odd parity. When bit 1 is 0, then the 68901 uses odd parity. When bit 1 is a 1, even parity is used. As indicated in Table II, bit 0 is not used.

rsr is the receiver status register. The rsr contains the buffer full bit, the overrun error bit, the parity error bit, the frame error bit, the break detect bit, the match bit, the synchronous strip enable bit, and the receiver enable bit.

Bit 7, the buffer full bit is a 1 when the USART has received a character. Bit 6, the overrun error bit is set to 1 if a new character arrives at the USART before the last character has been read. Bit 5, the parity error bit is set to a 1 if a received character has the wrong parity. Bit 4, the frame error bit is set if a character is received that has no stop bit. Bit 3, the break detect bit is set if a break signal is detected. Bit 2, the match bit is set if the received character matches the character in the synchronous character register. Bit 1, the synchronous strip enable bit controls whether the synchronous character is treated as a normal character or ignored by the USART. When this bit is a 1, the synchronous character is treated like a normal character by the USART. Bit 0, the receiver enable bit controls operation of the receive portion of the USART. When bit 0 is a 1, the USART operates normally. When bit 0 is a 0, the receive portion of the USART is reset. All the status bits are cleared to 0 and the receive portion is disabled.

TSR is the transmit status register. It contains the buffer empty bit, (bit 7) which is set to a 1 when the USART

transmit buffer is ready. Bit 6 is the underrun error bit, which is set to a one when if a character is completely transmitted before a new character is loaded into the buffer.

The 68901 uses double buffering the USART section. This means that the 68901 can be processing four characters at a time. The receive buffer can contain a character while the USART is assembling another received character. The transmit section can be transmitting a character using the transmit shift register and also contain a character in the transmit buffer that will be sent as soon as the transmit shift register is empty.

Bit 5 is the auto-turnaround bit. If this bit is set to a 1, the receiver is enabled as soon as the transmitter finishes sending a character.

Bit 4 is the end of transmission bit. If you disable the transmitter, the character in the transmit shift register will continue to send. When it is completely transmitted, bit 4 is set to a 1.

Bit 3 is the break bit. If this bit is set to a 1, then the USART will start sending a break signal. A break is a continuous 0 which is used by

some mainframes as a special signal.

Bit 2 is used along with bit 1 to control the state of the transmitter output. They select for high, low, high impedance or loopback modes. When the transmitter section is disabled, the output can be set to high, low or tri-state. You can also enter the loopback mode. Loopback routes the output of

the transmitter to the receiver. The settings of bits 2 and 1 are:

Bit 2	Bit 1	Transmitter output
0	0	High impedance
0	1	Logic 0 (Low)
1	0	Logic 1 (High)
1	1	Loopback

Bit 0 is the transmitter  
continued on page 219

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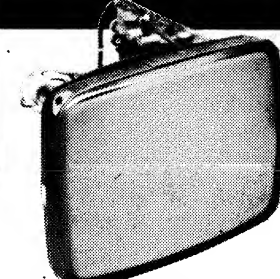
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## Hacking Atari ST continued from page 217

enable bit. When it is a 1, the transmitter portion of the USART is operational. Setting this bit to a 0 will disable the transmitter.

The synchronous character register is used to contain a character used by the USART when it is operated in the synchronous mode. Since most everyone will be using the 68901 in the asynchronous mode, I have glossed over the operation of the 68901 in the synchronous mode.

The small amount of information presented here should be enough to tell you that the 68901 is a complex chip. In addition to the USART, it contains parallel I/O, 4 counter/timers and interrupt generation/control circuits. If you wish to make use of the chip, the Motorola MC68901 Multi-Function Peripheral booklet is a must.

Thankfully, most of you can use the Rsconf() call and not worry too much about the internal workings of the chip. If any of the register parameters is a -1, then the Rsconf() call will not alter the register contents, so most of the configuration can be performed by using four -1s as the register parameters. If you need to set the number of data bits, the parity or the number of stop bits, then you will need to pass the correct value for the ucr parameter. The system defaults to 8 data bits, 1 start bit, 1 stop bit and no parity. Since this is the configuration needed for the XMODEM protocol, you will rarely need to alter the ucr setting.

If you do need to manipulate the MFP68901 directly, then you will need the register addresses within the Sts memory map. Be warned that the MMU and GLUE chips consider this area off limits to user programs. To read or write to these addresses you will have to be in the supervisor mode. There are 2 calls that can be used to switch the system to the supervisor state.

The first method (and my

favorite) is to use the extended bios call 38. This call is passed the address of a procedure. It will switch to the supervisor state, execute the procedure, switch back to the user mode and then return. I have written a few small routines in assembly language to perform memory reads and writes and these routines can be executed in the supervisor mode to access the MFP 68901. I will be going into more detail on these routines in the next column.

The second method is more trouble, but can be used in several ways. There is a GEM-DOS call, number 32, that can

be used to switch into supervisor mode. To use the GEM-DOS 32 call to switch to the supervisor mode you pass it as long 0, and it will return the old stack pointer. You can then execute code in the supervisor mode. To return to the user mode, call GEMDOS 32 with the old stack pointer value. Like the extended bios call, I'll cover this in more detail in the next column.

The addresses of the 68901 registers are given in Table III.

Remember the program I promised you? It is presented in listing 1. The main body sets up the serial port for 1200 baud

```

grip = 0xffff01; /* 68901 general purpose I/O register */
aer = 0xffff03; /* active edge register */
ddr = 0xffff05; /* data direction register */
iera = 0xffff07; /* interrupt enable register a */
ierb = 0xffff09; /* interrupt enable register b */
ipra = 0xffff0b; /* interrupt pending register a */
iprb = 0xffff0d; /* interrupt pending register b */
isra = 0xffff0f; /* interrupt in-service register a */
isrb = 0xffff11; /* interrupt in-service register b */
imra = 0xffff13; /* interrupt mask register a */
imrb = 0xffff15; /* interrupt mask register b */
vr = 0xffff17; /* vector register */
tacr = 0xffff19; /* timer a control register */
tbcdr = 0xffff1b; /* timer b control register */
tcdcr = 0xffff1d; /* timer c and d control register */
tadr = 0xffff1f; /* timer a data register */
tbdr = 0xffff21; /* timer b data register */
tcdr = 0xffff23; /* timer c data register */
tdr = 0xffff25; /* timer d data register */
scr = 0xffff27; /* synchronous character register */
ucr = 0xffff29; /* USART control register */
rsr = 0xffff2b; /* receiver status register */
tsr = 0xffff2d; /* transmitter status register */
udr = 0xffff2f; /* USART data register */

```

Table III

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operation, then we send the string to the modem that actually commands it to not answer the phone. If the program is left in the AUTO folder, then every time you boot the system, the modem will be commanded to not answer the phone. The msout procedure is used to send a string to the modem. It uses the Bconout function discussed in the last column.

```

#include <stdio.h>
#include <osbind.h>

```

```

main()
{
/*first we set up the serial port
*/Rsconf(7,0,-1,-1,-1,-1);
/*now we wait for everything
to get switched*/delay (250);
/* output the command to keep

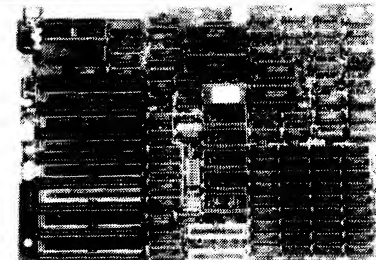
```

continued on page 221

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## Randy's Atari ST continued from page 74

```

1111 A:\DEMOS\DCOS.PAS
Show_Mouse ;
END;
which := Get_Event( E_Message|E_Timer, 0, 0, 0, 10000,
false, 0, 0, 0, false, 0, 0, 0, 0,
msg, dummy, dummy, dummy, dummy, dummy );
IF which & E_Message (> 0) THEN
IF (msg[0] = WM_Sized) OR (msg[0] = WM_Moved) THEN
BEGIN
IF msg[6] < min_width THEN
msg[6] := min_width ;
IF msg[7] < min_height THEN
msg[7] := min_height ;
Set_WSize( handle, msg[4], msg[5], msg[6], msg[7] ) ;
END
UNTIL msg[0] = WM_Closed ;
Close_Window( handle ) ;
Delete_Window( handle ) ;
Exit_Gem ;
END
END.

```

Fig. 2 Sample code & editor screen for personal pascal

made the comment that it "sure looks a lot like Lotus." I bought Lite because it was almost \$100 cheaper than the full-blown model and I heard that many bugs existed in VIP Professional. So far I have not encountered any of the bugs that were mentioned earlier on (i.e. the @DATE function suppositively always returned ERR when invoked under full VIP—it works fine under Lite.) But I did find some "annoying" things—if you have a ramdisk running sometimes the screen will come up completely black after its done booting and you can't see what you are doing; you can tell that it will happen after the VIP logo disappears: if your screen turns black, you got hit with the bug. Another item I noticed was when you try to dump the screen using ALT-Help it causes truncation of the screen to occur; it appears to make the assumption that you are using a wide-carriage printer and proceeds to dump the screen in wide-carriage format; I hope VIP fixes these annoyances on the next release. Should you even have the desire, VIP offers an upgrade path for \$80 and your original Lite disk. The GEM version is supposed to be out when Atari ships ST's with TOS ROMs and you'll have to go thru the same noise in sending your original disk in to VIP.

Personally, I can't see any immediate advantage in having VIP running as a GEM application outside of being able

to launch a desktop function; since its present interface is reasonably familiar to those people who presently use 1-2-3. I downloaded several templates from Delphi and they all function except for the lack of macros. Since I was used to using Multiplan and used to its constraints I found VIP Lite a relatively inexpensive way to get a Lotus work-alike at a reasonable price, even if I had

continued on page 224

## Hacking Atari ST continued from page 219

```

the modem quite */msout("AT
SO=0/r");
/* wait for everything to be sent
*/ delay (250);
}
VOID msout (p)
char *p;
/* send a string to the modem*/
{
while (*p != '\0')
{
Bconout(1,*p);
p ++ ;
}
}

```

Listing 1.  
Short program to silence a smart modem.

The second short program for the AUTO folder is named Epson. I have an old Epson printer I use with the ST. If you have played around with the Install printer routine, you know that the ST can work with the Atari printer or the Epson printer. The ST defaults

to the ATARI printer, so I have a short program to change it to the Epson setting.

This program uses the Setprt () extended bios call. If you call Setprt with an argument of -1, it will return the current configuration of the printer support. You can also set the printer configuration by using a different value for the Setprt call. The bit settings of the

Setprt call is shown in Table IV.

Bit	if 0	If 1
1	Dot matrix	Daisy wheel
2	Color	Monochrome
3	Draft mode	Final mode (NLQ)
4	Parallel	Serial
5	Pin feed	Single sheet

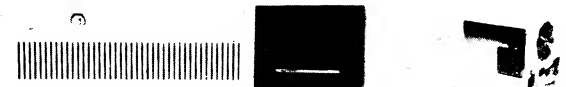
Table IV.  
Bit values for Setprt call  
continued on page 222

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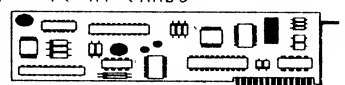
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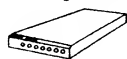


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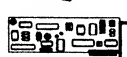
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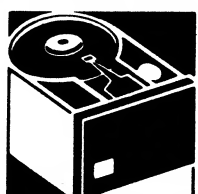
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### Hacking Atari ST continued from page 221

The balance of the bits in the word are reserved. The program will get the current value of the printer configuration, and then set the bit for Epson printers. The program is given in listing 2.

```
#include <stdio.h>
#include <osbind.h>
```

```
main()
{
    int current;
    current = Setprt(-1);
    current I = 0x0004;
    Setprt(current);
}
```

Listing 2.  
Program to configure for Epson support

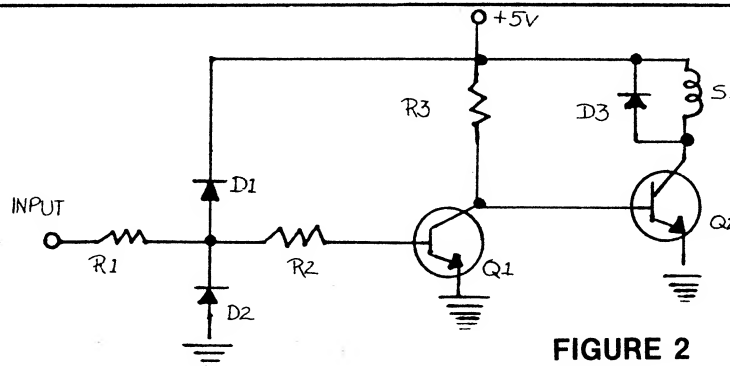


FIGURE 2

S1 .5v Dip Relay (Radio Shack 274-244)

D1, D2, D3 .....IN914

Q1, Q2 .....2N2222

R1, R2 ..3.9K 1/4 watt

3 .....390 1/4 watt

Circuit to control a relay using the DTR line.

Now for the small hardware project. There are 2 lines on the ST serial port that are used for handshaking that are outputs. The DTR line can be connected to drive a small relay with a few components and an hours worth of time.

The circuit I used is shown in Figure 2. The values are not critical, this is a junk box project. Be sure the transistor used for Q2 can handle the current needed to drive the relay. The Radio Shack relay I used needed just over 100 milliamps drive, so the 2N2222 is fine. With the input connected to the DTR line, you can use the Ongibit and Offgibit extended bios calls to switch the relay.

The Ongibit and Offgibit calls use mask values, not bit numbers. The Atari documentation is a little misleading on these calls. You may notice that the serial port hand shaking line come from the sound chip not the MFP 68901. (Oh well, everything still seems to work.) A couple of one-liners is all it takes to switch the relay. The programs appear in Listing 3.

```
#include <stdio.h>
#include <osbind.h>
```

```
main()
{
    Ongibit(0x10);
}
```

```
#include <stdio.h>
#include <osbind.h>
```

```
main()
{
    Offgibit(0xef);
}
```

Listing 3.

Programs to control a relay with the ST.

Diodes D1 and D2 work in conjunction with R1 to limit the voltage seen by the base of Q1. The DTR line uses RS-232 voltage levels of + and - 10 volts. To ensure that Q1 is not damaged, D1 and D2 clip the input signal at approximately 0 and + 5 volts. R3 supplies the base drive needed by Q2 to engage the relay. D3 is used to protect Q2 from the reverse EMF generated by the relay coil when Q2 switches off.

I built the circuit on a small perf board and used molex connectors to bring the signals

continued on page 223

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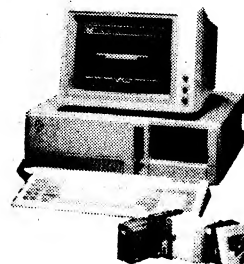
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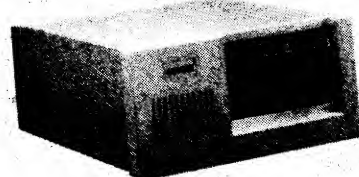
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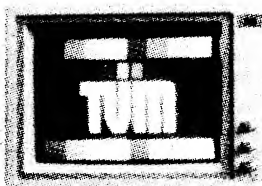


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### Hacking Atari ST continued from page 222

in and out. The relay can be driven by the DTR line under program control by using Ongibit (0x10) and Offgibit (0xef).

One I/O line doesn't seem like much, but that is all you need to switch between two different printers. You can also use the RTS line of the ST with a second circuit to control another relay. The DTR line is pin 20 and the RTS line is pin 4 of the serial connector.

If you dig around in your junk box, you should be able to come up with a relay or relays to use for printer switching. There are 10 active lines on the printer port so you will need 10 sets of contacts. Just use the relay wired to the DTR line to switch the relays that handle the printer port.

The active lines on the printer port are pins 1 through 9 and pin 11. The other pins are all grounds or no connections so they can be common to both printers, the only lines that need to be switched are the 10 active lines.

I have some relays I picked up at a surplus store that have 6 sets of contacts. Two of these have all the contacts needed for switching between the printer and a plotter I have attached to the ST. If you use the programs supplied to switch the printers, everything will be fine. If you write your own program to control the relays, be sure and allow time for the relays to switch, it is a good idea to use a delay (100) after switching the relay before trying to send data to the printer so that the relays have finished switching before you start.

Also, remember that the ST uses stream I/O, you may think you have finished printing, but there could still be up to 80 characters left in the printer buffer. You can delay a long time or you can check the buffer before switching.

This column is written for your benefit so let me hear what you want. Has this article had too much technical information in it, or not enough? What kind of projects would you like to see for the ST? ANTIC and ANALOG are Atari magazines and I have a good idea of the level of technical expertise of their readers, but the Shopper audience for the ST is still largely unknown, we know that you are out there, but we have no idea if you are a computer architecture expert or a beginning BASIC programmer. If you tell us what you need in the way of information on the ST, we'll be glad to provide it.

I will supply a disk with the demo programs on it in source and executable form. Instead of having an almost empty disk

every time, we will try to group 2 or 3 articles worth of programs on every disk. If you want the disk containing the programs for this article, send \$6 to:

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3456 Willis Drive  
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Be sure and mention you

want disk 1 of the Shopper ST series.

The complete pin-outs for the Serial and Parallel ports for the ST can be found in Appendix D of your Atari 520 owner's manual.

If you need the *MFP 68901 Multi-Function Peripheral Manual* try contacting Motorola at:

Motorola Semiconductors

3501 Ed Bluestein Blvd.,  
Austin, Texas 78721.

Please note that they are not available to the general public, so use your business letterhead when writing.

A special folder "AUTO" can be used to hold programs that you want to execute as part of the boot up routine on your ST. We covered the Rscnf() call that allows you to

configure the serial port. Also covered was the Setprt() call used to configure the printer driver used by the ST.

There are three extents for executable files recognized by the ST, .PRG, .TOS and .TTP. These extents tell the ST what kind of environment to prepare for the application. You can obtain the same effect by installing the application. ●

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### US Air Force continued from page 30

adapted to guide a ship.

"But Ada is not an easy language to master, and there is currently a nationwide shortage of software specialists with 'Ada fluency'," said J. David McGonagle of the GE Research and Development Center, who is managing the GE/Air Force program.

The overall goal of the GE

team involved in the development contract, he indicated, is to devise software tools that help "coach" users through the demanding process of programming in Ada. For example, the software will have built-in expert system "advisors" that "ask" the user questions about the program he or she wants to write and, based on the answers, suggest ways to go about it.

To simplify the actual

writing task, the GE software will incorporate special "editors" software routines that present a "fill-in-the-blanks" format for composing particular instructions in Ada.

In addition, GE is developing advanced software routines that will enable Ada authors to "program with pictures"-i.e., generate Ada code simply by drawing diagrams, charts, or other types of graphics on the computer screen. While the graphics are being drawn, hundreds of lines of Ada code will be automatically generated, increasing programming productivity substantially.

The software development contract calls for the delivery of six prototype software packages, each of which builds on-and is more powerful than-the one that preceded it. The final package is set for delivery at the completion of the contract, in August 1988.

The software is being developed on a LISP machine, but will be amenable to implementation on various other systems in its final form.

For further information contact General Electric Company Corporate Research And Development, P.O. Box 8, Schenectady, NY, 12301.

Mention that you read about it in *Computer Shopper*. •

### Randy's Atari ST continued from page 221

to sacrifice some features in the short term. The documentation leaves a lot to be desired in terms of completeness and clarity: in fact they list a whole bunch of other reference sources for the user to chase after, if VIP's docs didn't answer their question. As soon as I get the TOS ROMs (more like if I ever get the TOS ROMs) and the GEM version of VIP I'll report back with an update. For now, if you need a spreadsheet and can live without macros or the database features, VIP Professional Lite *does* work and should be up to whatever task you have at hand.

I picked up MichTron BBS on a whim just to see what the first commercial BBS for the ST operates and it's not bad at all. (MichTron, 576 S. Telegraph, Pontiac, MI 48053; (313) 334-5700, suggested retail \$49.95, no copy protection.) Although the documentation was a bit confusing I was able to bring the system up in an evening's worth of time. The BBS provides for up to 16 areas, each with their own upload/download space, and supports XMODEM, DFT and ASCII transfers, and also has a "screening" feature which allows you to inspect messages

before you let them loose on the public. A nice feature is being able to emulate a user from the keyboard while no one else is on the system for checkout purposes; and if you have your printer on-line it will generate

a nifty audit trail of who has called and what they did; during a live session you can see exactly what commands and functions they are performing on your ST monitor. MichTron's BBS supports intelligent modems and supports automatic 300/1200 bps switching (you'll have to do some cable re-wiring, however, but that's relatively easy to do). Now that I have my Lotus clone all that I need to do when I want to work on a spreadsheet at home is to boot up the BBS before I leave for work, call it up and upload the sheet from the IBM PC at work to my ST. Then when I arrive home it's there for me to manipulate; when I'm through with it I put the file back out on the BBS and then download it from work the following day. (The BBS looks pretty tight and would probably withstand a good attack.) If you want to see what the BBS looks like from a user's viewpoint call up MichTron's BBS (running on a Sanyo) at (313) 332-5452 and give it a spin. For under \$50, it's a solid performer. •

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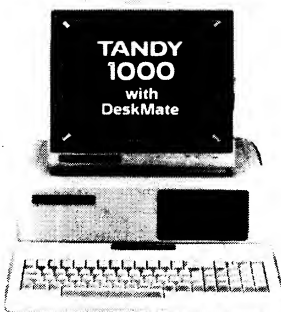
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